AMENDMENTS TO THE CLAIMS

In the Claims

Original claims 1-11 were canceled in the Reissue application that is the parent to this application. They are presented herebelow with brackets. Claims 12-46 were previously canceled by the Preliminary Amendment, filed January 10, 2001, with this Reissue Continuation Application. Claims 47-126 were presented through the Preliminary Amendment, filed January 10, 2001. Please now cancel claims 47-126, without prejudice, and add new claims 127-195, as follows:

[1. A system for efficiently charging and discharging a capacitive load from a single voltage source of a first potential consisting of:

a first switch for selectively charging the load;

a second switch for selectively discharging the load;

plural capacitive elements; and

switch means for selectively connecting each of the capacitive elements to the capacitive load to gradually charge or discharge the capacitive load.]

[2. The invention of claim 1 wherein said switch means includes plural third switches connected between said capacitive elements and said load.]

[3. The invention of claim 2 wherein said switch means includes means for selectively activating the first, second and third switches.]

[4. The invention of claim 3 wherein the capacitive load has a first terminal connected to the first switch and a second terminal connected to a

source of a second potential.]

[5. The invention of claim 4 wherein the second switch has a first terminal connected to the first terminal of the load and a second terminal connected to said source of a second potential.]

[6. The invention of claim 5 wherein each of the third switches has a first terminal connected to the first terminal of the load and a second terminal connected to a first terminal of an associated one of the plural capacitive elements.]

[7. The invention of claim 6 wherein the means for selectively activating the first, second and third switches includes a finite state machine.]

[8. The invention of claim 7 wherein the finite state machine is designed to receive a clock signal and an input signal and provide selective activation signals for the first, second and third switches in response thereto.]

[9. The invention of claim 8 wherein a second terminal of each of the plural capacitive elements is connected to said source of a second potential.]

[10. The invention of claim 9 wherein each of the capacitive elements has a capacitance which is at least an order of magnitude greater than the capacitance of the load.]

[11. A method for efficiently charging and discharging a capacitive load from a single voltage source including the steps of:

providing a first switch for selectively connecting the voltage source to the load;

providing a second switch for selectively providing a short across

the load;

providing plural capacitive elements;

providing plural third switches for selectively connecting each of the capacitive elements to the capacitive load; and

selectively activating the first, second and third switches to gradually charge or discharge the capacitive load.]

12-126. (Canceled)

~~127. An apparatus for driving a capacitive load, comprising:~~

a voltage source; and

a switch network,

wherein the switch network is operable to electrically connect the capacitive load and the voltage source to drive the load to a first voltage level, and

wherein the switch network is further operable to electrically connect the capacitive load and a capacitive storage system, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, a voltage level of the ~~capacitive storage system tends to self-stabilize to a second voltage level.~~

128. An apparatus as claimed in claim 127, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element.

129. An apparatus as claimed in claim 127, wherein the capacitive storage system comprises a plurality of capacitive elements.

130. An apparatus as claimed in claim 127, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch

network, the capacitive storage system and the capacitive load are electrically floating.

131. An apparatus as claimed in claim 127, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected in parallel.

132. An apparatus as claimed in claim 127, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected such that a first terminal of the first capacitive element is electrically connected to a first terminal of the second capacitive element and a second terminal of the first capacitive element and a second terminal of the second capacitive element are electrically connected to a common potential.

133. An apparatus as claimed in claim 127, wherein the switch network comprises a plurality of switching elements.

134. An apparatus as claimed in claim 127, wherein the switch network comprises a plurality of MOS transistors.

135. An apparatus as claimed in claim 127, wherein a capacitance of the capacitive storage system is larger than a capacitance of the capacitive load.

136. An apparatus as claimed in claim 127, wherein a capacitance of the capacitive storage system is an order of magnitude larger than a capacitance of the capacitive load.

137. An apparatus as claimed in claim 127, wherein the apparatus is a driver.

138. An apparatus as claimed in claim 127, wherein the switch network is further operable to electrically connect the capacitive load and the voltage source to drive the capacitive load to a third voltage level, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive load settles at a second voltage level between the first and third voltage levels, and wherein during operation of the apparatus, the capacitive load is first driven to the first voltage, then subsequently settles at the second voltage level, and then is subsequently driven to the third voltage level.

~~139. An apparatus comprising:~~

a capacitive load;

a voltage source;

a switch network; and

a capacitive storage system,

wherein the switch network is operable to electrically connect the capacitive load and the voltage source to drive the load to a first voltage level, and

wherein the switch network is further operable to electrically connect the capacitive load and the capacitive storage system, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, a voltage level of the ~~capacitive storage system tends to self stabilize to a second voltage level.~~

140. An apparatus as claimed in claim 139, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element.

141. An apparatus as claimed in claim 139, wherein the capacitive storage system comprises a plurality of capacitive elements.

142. An apparatus as claimed in claim 139, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically floating.

143. An apparatus as claimed in claim 139, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected in parallel.

144. An apparatus as claimed in claim 139, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected such that a first terminal of the first capacitive element is electrically connected to a first terminal of the second capacitive element and a second terminal of the first capacitive element and a second terminal of the second capacitive element are electrically connected to a common potential.

145. An apparatus as claimed in claim 139, wherein the switch network comprises a plurality of switching elements.

146. An apparatus as claimed in claim 139, wherein the switch network comprises a plurality of MOS transistors.

147. An apparatus as claimed in claim 139, wherein a capacitance of the capacitive storage system is larger than a capacitance of the capacitive load.

148. An apparatus as claimed in claim 139, wherein a capacitance of the capacitive storage system is an order of magnitude larger than a capacitance of the capacitive load.

149. An apparatus as claimed in claim 139, wherein the switch network is further operable to electrically connect the capacitive load and the voltage source to drive the capacitive load to a third voltage level, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive load settles at a second voltage level between the first and third voltage levels, and wherein during operation of the apparatus, the capacitive load is first driven to the first voltage, then subsequently settles at the second voltage level, and then is subsequently driven to the third voltage level.

sub C3

~~150. An apparatus for driving a capacitive load, comprising:~~

a voltage source; and

a switch network,

wherein the switch network is operable to electrically connect the capacitive load and the voltage source to drive the load to a first voltage level, and

wherein the switch network is further operable to electrically connect the capacitive load and a capacitive storage system, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage ~~system is electrically isolated from the voltage source~~.

151. An apparatus as claimed in claim 150, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element.

152. An apparatus as claimed in claim 150, wherein the capacitive storage system comprises a plurality of capacitive elements.

153. An apparatus as claimed in claim 150, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically floating.

154. An apparatus as claimed in claim 150, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected in parallel.

155. An apparatus as claimed in claim 150, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected such that a first terminal of the first capacitive element is electrically connected to a first terminal of the second capacitive element and a second terminal of the first capacitive element and a second terminal of the second capacitive element are electrically connected to a common potential.

156. An apparatus as claimed in claim 150, wherein the switch network comprises a plurality of switching elements.

157. An apparatus as claimed in claim 150, wherein the switch network comprises a plurality of MOS transistors.

158. An apparatus as claimed in claim 150, wherein a capacitance of the capacitive storage system is larger than a capacitance of the capacitive load.

159. An apparatus as claimed in claim 150, wherein a capacitance of the capacitive storage system is an order of magnitude larger than a capacitance of the capacitive load.

160. An apparatus as claimed in claim 150, wherein the apparatus is a driver.

161. An apparatus as claimed in claim 150, wherein the switch network is further operable to electrically connect the capacitive load and the voltage source to drive the capacitive load to a third voltage level, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive load settles at a second voltage level between the first and third voltage levels, and wherein during operation of the apparatus, the capacitive load is first driven to the first voltage, then subsequently settles at the second voltage level, and then is subsequently driven to the third voltage level.

~~162. An apparatus comprising:~~

a capacitive load;

a voltage source;

a switch network; and

a capacitive storage system,

wherein the switch network is operable to electrically connect the capacitive load and the voltage source to drive the load to a first voltage level, and

wherein the switch network is further operable to electrically connect the capacitive load and the capacitive storage system, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system is electrically isolated from the voltage source.

163. An apparatus as claimed in claim 162, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element.

164. An apparatus as claimed in claim 162, wherein the capacitive storage system comprises a plurality of capacitive elements.

165. An apparatus as claimed in claim 162, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically floating.

166. An apparatus as claimed in claim 162, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected in parallel.

167. An apparatus as claimed in claim 162, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected such that a first terminal of the first capacitive element is electrically connected to a

first terminal of the second capacitive element and a second terminal of the first capacitive element and a second terminal of the second capacitive element are electrically connected to a common potential.

168. An apparatus as claimed in claim 162, wherein the switch network comprises a plurality of switching elements.

169. An apparatus as claimed in claim 162, wherein the switch network comprises a plurality of MOS transistors.

170. An apparatus as claimed in claim 162, wherein a capacitance of the capacitive storage system is larger than a capacitance of the capacitive load.

171. An apparatus as claimed in claim 162, wherein a capacitance of the capacitive storage system is an order of magnitude larger than a capacitance of the capacitive load.

172. An apparatus as claimed in claim 162, wherein the switch network is further operable to electrically connect the capacitive load and the voltage source to drive the capacitive load to a third voltage level, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive load settles at a second voltage level between the first and third voltage levels, and wherein during operation of the apparatus, the capacitive load is first driven to the first voltage, then subsequently settles at the second voltage level, and then is subsequently driven to the third voltage level.

sub C5

~~173. An apparatus for driving a capacitive load, comprising:~~

a voltage source; and

~~a switch network.~~

wherein the switch network is operable to electrically connect the capacitive load and the voltage source to drive the load to a first voltage level, and

wherein the switch network is further operable to electrically connect the capacitive load and a capacitive storage system, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically floating.

174. An apparatus as claimed in claim 173, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element.

175. An apparatus as claimed in claim 173, wherein the capacitive storage system comprises a plurality of capacitive elements.

176. An apparatus as claimed in claim 173, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically disconnected from the voltage source.

177. An apparatus as claimed in claim 173, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected in parallel.

178. An apparatus as claimed in claim 173, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive

storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected such that a first terminal of the first capacitive element is electrically connected to a first terminal of the second capacitive element and a second terminal of the first capacitive element and a second terminal of the second capacitive element are electrically connected to a common potential.

179. An apparatus as claimed in claim 173, wherein the switch network comprises a plurality of switching elements.

180. An apparatus as claimed in claim 173, wherein the switch network comprises a plurality of MOS transistors.

181. An apparatus as claimed in claim 173, wherein a capacitance of the capacitive storage system is larger than a capacitance of the capacitive load.

182. An apparatus as claimed in claim 173, wherein a capacitance of the capacitive storage system is an order of magnitude larger than a capacitance of the capacitive load.

183. An apparatus as claimed in claim 173, wherein the apparatus is a driver.

184. An apparatus as claimed in claim 173, wherein the switch network is further operable to electrically connect the capacitive load and the voltage source to drive the capacitive load to a third voltage level, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive load settles at a second voltage level between the first and third voltage levels, and wherein during operation of the apparatus, the capacitive load is first driven to the first voltage, then subsequently settles at

the second voltage level, and then is subsequently driven to the third voltage level.

Sub C6

~~185. An apparatus comprising:~~

a capacitive load;

a voltage source;

a switch network; and

a capacitive storage system,

wherein the switch network is operable to electrically connect the capacitive load and the voltage source to drive the load to a first voltage level, and

wherein the switch network is further operable to electrically connect the capacitive load and the capacitive storage system, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically floating.

186. An apparatus as claimed in claim 185, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element.

187. An apparatus as claimed in claim 185, wherein the capacitive storage system comprises a plurality of capacitive elements.

188. An apparatus as claimed in claim 185, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive storage system and the capacitive load are electrically disconnected from the voltage source.

189. An apparatus as claimed in claim 185, wherein the capacitive load comprises a first capacitive element and the capacitive storage system

comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected in parallel.

190. An apparatus as claimed in claim 185, wherein the capacitive load comprises a first capacitive element and the capacitive storage system comprises a second capacitive element, and wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the first and second capacitive elements are electrically connected such that a first terminal of the first capacitive element is electrically connected to a first terminal of the second capacitive element and a second terminal of the first capacitive element and a second terminal of the second capacitive element are electrically connected to a common potential.

191. An apparatus as claimed in claim 185, wherein the switch network comprises a plurality of switching elements.

192. An apparatus as claimed in claim 185, wherein the switch network comprises a plurality of MOS transistors.

193. An apparatus as claimed in claim 185, wherein a capacitance of the capacitive storage system is larger than a capacitance of the capacitive load.

194. An apparatus as claimed in claim 185, wherein a capacitance of the capacitive storage system is an order of magnitude larger than a capacitance of the capacitive load.

195. An apparatus as claimed in claim 185, wherein the switch network is further operable to electrically connect the capacitive load and the voltage

source to drive the capacitive load to a third voltage level, wherein when the capacitive storage system and the capacitive load are electrically connected by the switch network, the capacitive load settles at a second voltage level between the first and third voltage levels, and wherein during operation of the apparatus, the capacitive load is first driven to the first voltage, then subsequently settles at the second voltage level, and then is subsequently driven to the third voltage level.